

### **REMARKS/ARGUMENTS**

In view of the foregoing amendments and following remarks, favorable reconsideration of the pending claims is requested.

#### ***Status of the Claims***

Claims 1-4 and 6-11 are under examination. Claims 5, 12, and 13 have been withdrawn.

Claim 1 has been amended to clarify that the claimed invention is directed to a process for the formation of a polymer film on a cathodic electrically conducting or semiconducting surface. Claim 1 has also been amended to recite that the source of protons are present in an amount of between 50 and 10,000 ppm. See Claim 9.

Claim 9 has been cancelled. Claims 5, 12, and 13 are also cancelled by way of this amendment.

#### ***Prior Art Rejections***

Claims 1-4, 6-8 and 10 are rejected as being anticipated by Hodes et al. Claim 9 has been rejected as being unpatentable over Hodes et al. and Claim 11 has been rejected as being unpatentable over Hodes et al. in view of Jerome et al.

Claims 1, 2 and 6-10 are also rejected as being unpatentable over Naarmann.

Before discussing the rejections in detail, it may be useful to first briefly review the claimed invention. The claimed invention as defined in amended Claim 1 is directed to an electro-grafting process for the formation of a polymer film on a cathodic electrically conducting or semiconducting surface by first preparing an electrolytic solution comprising one or more electro-polymerizable monomers and at least one source of protons, and then by electrolyzing the said solution in an electrolysis cell, by electro-reduction or electro-oxidation.

The electrolytic solution of the invention comprises at least one source of protons which is present in an amount varying from 50 to 10,000 ppm.

#### ***1. Hodes does not disclose or suggest the claimed invention.***

The reference of Hodes et al. discloses the deposition of a thick and adherent polymer coating on a metallic cathode from a solution containing a solvent in which a polymerizable monomer, a strong acid and an electrochemical initiator are soluble.

Hodes et al. also describe at column 2, lines 20 to 35 a water solution (10 mL) containing 10 wt% of acrylamide, 1 wt% of N,N' - methylenebisacrylamide, 2 wt% of N,N'-ethylenebisacrylamide and 0.5 mL of concentrated HCl.

The Examiner indicates that concentrated HCl contains 38% of hydrogen chloride (Condensed Chemical Dictionary, pp. 486-487), and that an amount of 0.5 mL of 38% hydrogen chloride in 10 mL of water corresponds to approximately 19,000 ppm. Accordingly, Hodes does not disclose each and every element of Claim 1 and therefore does not anticipate the claimed invention.

Hodes also does not disclose or suggest at least one source of protons that is present in an amount varying from 50 to 10,000 ppm as recited in Claim 1. To overcome this deficiency, the Examiner contends that the proton concentration is a result effective variable. Applicants respectfully disagree with the Examiner's assertion. As clearly spelled out in MPEP Section 2144.05, for a particular parameter to be considered a result-effective variable the art must first recognize that the parameter is such. In the present case, there is no teaching or recognition in the art that the concentration of the Bronsted acid has any effect whatsoever on the polymerization reaction, and the Examiner has also failed to provide any reasoning as to how the cited art recognizes that concentration of the Bronsted acid is a result effective variable. Accordingly, the Examiner has failed to meet this initial burden in establishing that the claimed range of at least one source of protons in an amount varying from 50 to 10,000 ppm is obvious in view of the cited art. Having failed to establish that the recited range is a result effective variable, selecting a concentration range cannot be considered optimization through routine experimentation.

For the sake of argument, even if one were to consider that concentration was a result effective variable, the claimed invention would still not be obvious in view of Hodes. In particular,

Hodes does not disclose or suggest that the limitation of the Bronsted acid content from 50 to 10,000 ppm may significantly improve the control of the thickness of the electro-grafted film, as is achievable with the claimed invention. Accordingly, Hodes fails to disclose or suggest the claimed invention and therefore this rejection should be withdrawn.

Furthermore, Applicant wants to draw the Examiner's attention on the experimental results presented in the Application. As described in Example 1, Figure 2 shows that the thickness of electro-grafted films passes through a maximum for an intermediate water content (which is closed to 800 ppm), before decreasing and disappearing for very high water contents.

The advantageous technical effect of the specific protons content range was also clearly demonstrated in Example 4 and Figure 4 which illustrate the fact that the curves giving the thickness as a function of the protons content are curves which pass through a maximum lower than 10,000 ppm. Besides these results show the existence of a water content of greater than 50 ppm for which the thickness obtained is greater than that accessible under anhydrous conditions. It is observed that the slopes of the curves are, in absolute value, lower above this concentration than below: it is therefore with control of the protons content above this concentration, and not below, that it is possible to achieve good control with regard to the thicknesses of the films obtained.

Finally, Example 5 and corresponding Figure 5 demonstrate that according to the support electrolyte the protons content of the medium can be adjusted to the value of the maximum of the thickness/protons content curves and that it is thus possible to have available solutions which decrease in hygroscopicity, and thus increase in stability, as this protons content increases. It appears from Figure 5, which represents the thickness of the films obtained as a function of the protons content, that the thickness of the electro-grafted films is maximal for protons content going from 400 to approximately 1,000 ppm.

The Applicant respectfully submit that the cited prior art, whether taken alone or in combination, does not disclose or suggest the claimed invention and the improvement of the control of the electro-grafted film thickness when using an amount of from 50 to 10,000 ppm of a Bronsted acid, said improvement being observed for different monomer concentrations of the electrolytic solution.

Jerome does not cure the deficiencies of Hodes. In particular, Jerome is directed to a method for forming a coating on conductive particles by grafting a polymer and/or a copolymer in an aprotic solvent. Therefore, Jerome does not disclose or suggest the formation of a polymer film in an electrolytic solution comprising from 50 to 10,000 ppm of at least one Bronsted acid,

in order to better control the thickness of the electro-grafted film. As such, the combination of Jerome and Hodes does not disclose or suggest the claimed invention.

**2. *Naarmann does not disclose or suggest the claimed invention.***

Naarmann relates to the electrochemical polymerization of pyrroles by anodic oxidation of monomers in an electrolyte solvent and in the presence of a conductive salt.

Therefore, Naarmann concerns by no means the grafting and the growth of polymer films on cathodic surface. Now, the man skilled in the art knows very well that during an anodic electropolymerization (as in Naarmann) the presence of protons is not problematic as far as only radical cations which do not interact with protons are formed at the anode. Accordingly, Naarmann fails to disclose or suggest the claimed invention. Withdrawal of the rejections based on Naarmann is respectfully requested.

As noted above in the discussion regarding Hodes, the claimed invention also provides improvements that are not disclosed or suggested by anyone of Hodes, Jerome, or Naarmann. More specifically, Applicant submits that the cited art does not disclose or suggest the claimed invention and the improvement of the control of the electro-grafted film thickness when using an amount of from 50 to 10,000 ppm of a Bronsted acid, said improvement being observed for different monomer concentrations of the electrolytic solution.

Indeed, a man skilled in the art would never have been incited by the cited prior art to limit the protons content to better control the thickness of the electro-grafted film, such an advantageous technical effect having been unequivocally demonstrated in the Examples of the Application.

In view of the foregoing amendments and remarks, Applicants submit that the claimed invention is not disclosed or suggested by the cited art and that the claimed invention provides advantages that are not disclosed or suggested by the cited art. Consequently, the invention as claimed does fulfill non-obviousness criterion with respect to the cited prior art, and its patentability is therefore completely demonstrated.

Applicant respectfully submits that Claims 1, 3-4, 6-8, 10-11 are in condition for allowance.

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It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Timothy J. Balts', with a long horizontal flourish extending to the right.

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